# Natural Regions

REPORT NO. 1

# A Framework for Alberta's Special Places

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# Protecting Alberta's future through Special Places 2000

Special Places 2000: Alberta's Natural Heritage is a strategic plan for coordinating the designation and protection of the diverse natural landscapes of Alberta. As part of a world-wide strategy for the conservation of our planet's natural heritage, it works in support of similar initiatives occurring at the provincial, national and international level.

At the international level, Special Places 2000 supports the Biodiversity Convention presented in June 1992 at the Earth Summit in Rio (United Nations Conference on Environmental Development). That convention called on all the nations of the Earth to help develop a sustainable future by protecting the full range of the world's natural resources. Nationally, Special Places 2000 supports the World Wildlife Fund (Canada), Endangered Spaces program which has been committed to by the Government of Canada. On a provincial level, the Government of Alberta, in "Toward 2000 Together – the Premier's Conference on Alberta's Economic Future", described sustainable development as key to Alberta's future. Protected areas are a key component of sustainable development.

## A Wealth of Nature Deserves Our Care

Alberta enjoys a wealth of natural features. The diversity of our natural regions is reflected in the landscapes of our Parkland, Grassland, Rocky Mountain, Foothills, Canadian Shield and Boreal Forest regions. Each has been shaped by a combination of climatic, geologic and evolutionary processes.

*Above: Wild Rose (Alberta Parks Service)*
*Below: Milk River (Archie Landals)*

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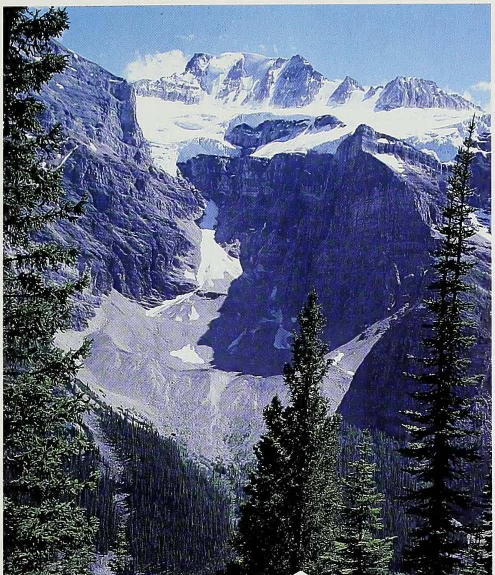
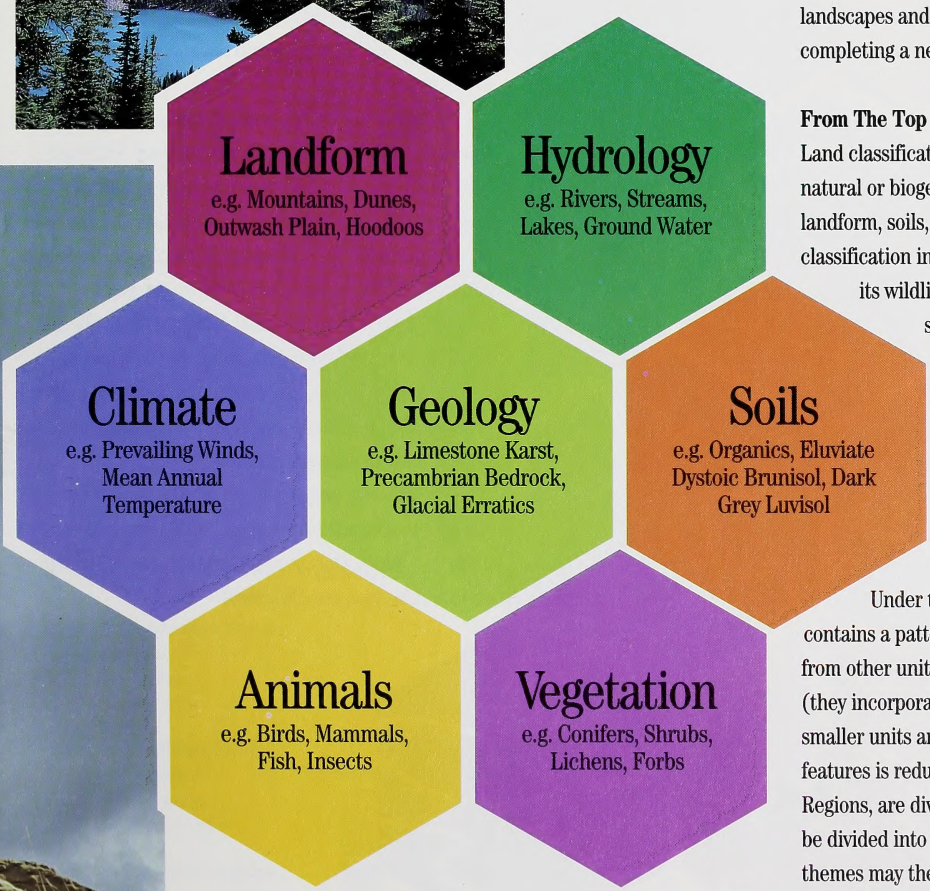


*Left: Moraine Lake (Archie Landals)*
*Below: Figure 1 - Factors that contribute to land classification.*


Landform
e.g. Mountains, Dunes, Outwash Plain, Hoodoos
Hydrology
e.g. Rivers, Streams, Lakes, Ground Water
Climate
e.g. Prevailing Winds, Mean Annual Temperature
Geology
e.g. Limestone Karst, Precambrian Bedrock, Glacial Erratics
Soils
e.g. Organics, Eluviate Dystoic Brunisol, Dark Grey Luvisol
Animals
e.g. Birds, Mammals, Fish, Insects
Vegetation
e.g. Conifers, Shrubs, Lichens, Forbs

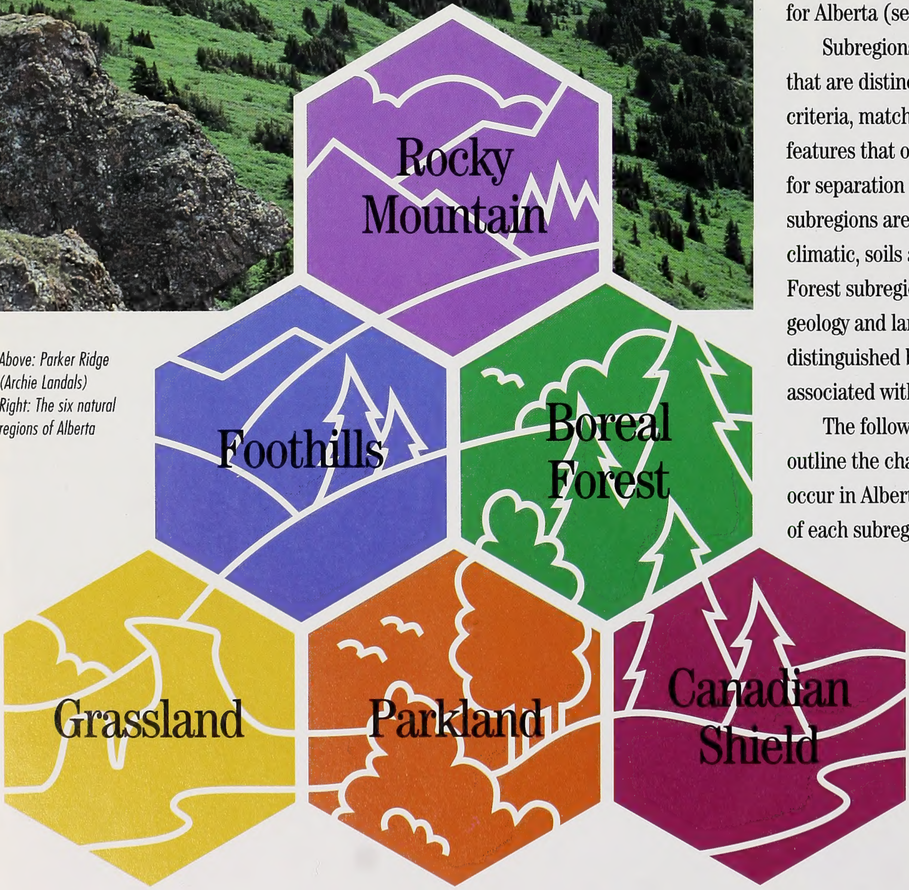
Protected areas such as ecological reserves, wilderness areas and natural areas conserve examples of this natural diversity. Today, and into the 21st century, our challenge will be to continue to designate and secure representative examples of all of the landscapes of our natural regions and subregions. By acting now to identify and protect these areas, we can help to ensure that they will continue to exist for the benefit of future generations.

This report "Natural Regions: A Framework for Alberta's Special Places" provides an overview of the land classification system used to describe our natural landscapes and how we can measure our progress toward completing a network of protected areas.

**From The Top Down**

Land classification for protected areas is based on natural or biogeographic features such as geology, landform, soils, and hydrology. Other factors affecting classification include an area's climate, its vegetation and its wildlife (see Fig. 1). The classification system is set up in such a way that larger, more general categories of land are identified and then divided into smaller units on the basis of their specific natural characteristics. Because this kind of classification system separates larger units into smaller units we refer to it as working "from the top down."

Under the system, each unit, large or small, contains a pattern of features which clearly distinguish it from other units. Larger units are more heterogeneous (they incorporate a greater variety of features) and smaller units are more homogeneous (the variety of features is reduced). The largest units, the Natural Regions, are divided into Subregions, which in turn may be divided into a series of Natural History Themes. These themes may then be further subdivided into finer levels.



*Above: Parker Ridge (Archie Landals)*
*Right: The six natural regions of Alberta*

**Regionally Speaking**

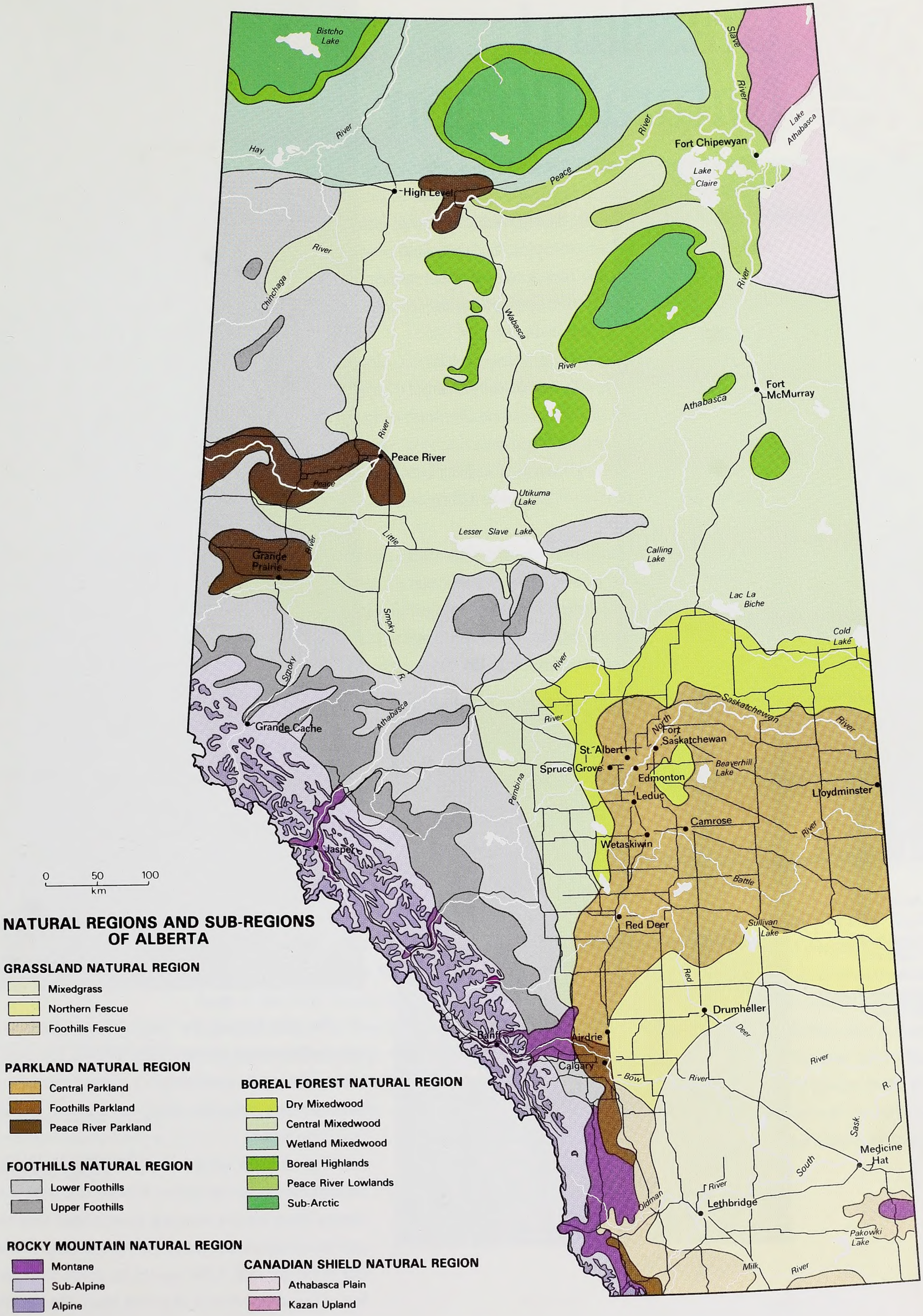
Natural regions provide the big picture of Alberta's landscapes. Each of the landscape patterns of an individual region contain a mix of similar vegetation, soil and landform features.

There are six natural regions in Alberta: Grassland, Parkland, Foothills, Boreal Forest, Rocky Mountain and Canadian Shield. Alberta's largest natural region is the Boreal Forest Region. The smallest is the Canadian Shield Region. The remaining four regions are comparable in size to each other.

Each of the six natural region has been divided into subregions. A total of nineteen subregions is recognized for Alberta (see map).

Subregions are areas with similar landscape patterns that are distinct from the other subregions. Different criteria, matched to the range and scale of natural features that occur within each natural region, are used for separation of the subregions. For example, Grassland subregions are separated primarily on the basis of climatic, soils and vegetational factors whereas Boreal Forest subregions are separated by their vegetation, geology and landforms. Rocky Mountain subregions are distinguished by differences in environmental conditions associated with changes in elevation.

The following pages contain brief summaries which outline the characteristics of each of the subregions that occur in Alberta. Only the highlights and typical features of each subregion are discussed.



## NATURAL REGIONS AND SUB-REGIONS OF ALBERTA

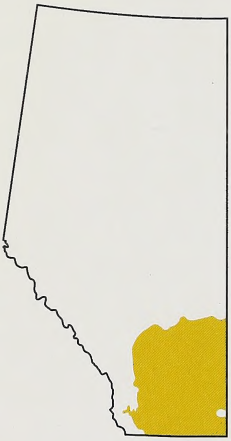
*Produced by Alberta Parks Service, Management Support Branch.*

# Grassland Natural Region

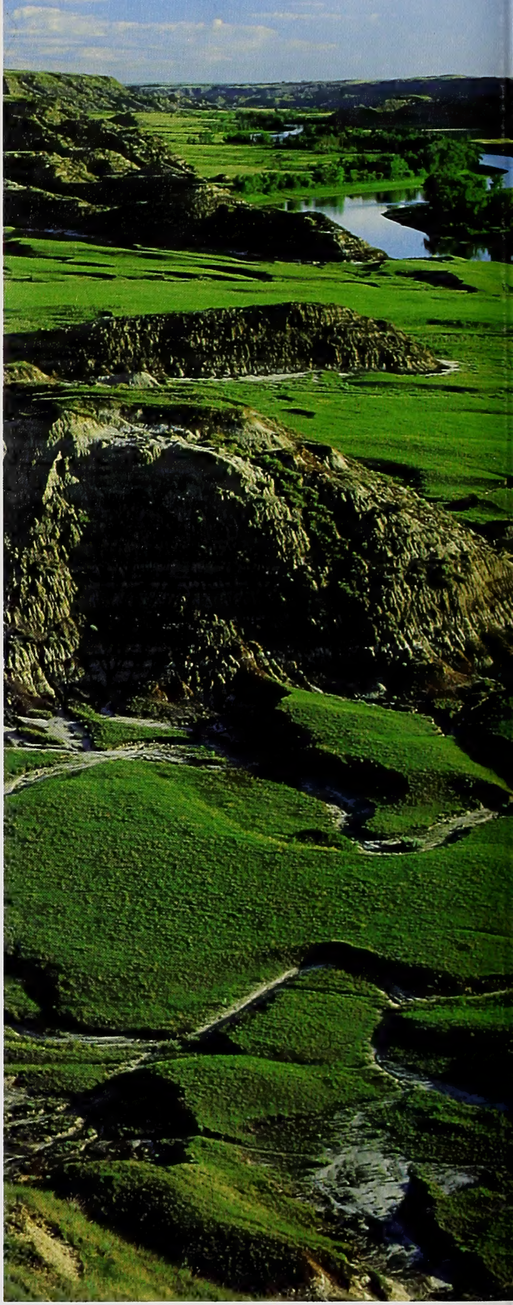
This Grassland Natural Region is a flat-to-gently rolling plain with a few major hill systems. Most of the bedrock is covered with glacial till deposits. Some areas are blanketed by glacial lake sediments, sand dune fields and outwash plains. Badlands have developed where river valleys and their associated coulees and ravines are carved deeply into bedrock, especially along the Red Deer, South Saskatchewan and Milk rivers. The Milk River drainage contains the only exposures of igneous bedrock in the grasslands of western Canada. All other bedrock exposures are of sedimentary rocks.

Three subregions occur in this natural region. Each is distinguished by differences in climate, soils and vegetation.

The **Mixedgrass Subregion** is generally of low relief. Elevations range from 600 metres above sea level near Empress to more than 1300 metres on the lower slopes of the Cypress Hills, Sweetgrass Hills and Milk River Ridge. This subregion is the warmest and driest in Alberta.



*Above: Thorny buffalo berry (Archie Landals)*
*Right: Kennedy Coulee Ecological Reserve provides an undisturbed benchmark against which to measure management practices in the **Mixedgrass Subregion**. (Charles Truscott)*



The name "Mixedgrass" comes from the predominance of both short and mid-height grasses. The most widespread are the mid-grasses (e.g., spear grass, western wheat grass, June grass) and the short grasses (e.g., blue grama).

Of the three grassland subregions, the Mixedgrass Subregion contains the highest diversity of animal species. Many species especially those of sand dune areas and the extreme southeast part of Alberta occur nowhere else in the province. A few species are absent from the rest of Canada or occur in only local areas. Characteristic

species of heavily grazed uplands include horned lark, McCown's longspur, chestnut-collared longspur and Richardson's ground squirrel. Species of lightly grazed areas include Baird's sparrow, Sprague's pipit, sharp-tailed grouse and upland sandpiper. Sage grouse, lark bunting, Brewer's sparrow and pronghorn prefer sagebrush communities.

Sandy areas support some rare species including Ord's kangaroo rat and western hognose snake. Riparian shrublands and forests support a diverse animal community, including brown thrasher, gray catbird, yellow-breasted chat, mourning dove, northern flicker, house wren, northern oriole, deer mouse, Nuttall's cottontail and white-tailed deer.

Rock outcrops and badlands provide nesting habitat for golden eagle, rock wren, ferruginous hawk, prairie falcon and mountain bluebird. Wetlands are home to several bird species as well as the boreal chorus frog, northern leopard frog, plains spadefoot toad and garter snake.

The **Northern Fescue Subregion** is characterized by gently rolling ground moraine and hummocky moraine. Sand plains, dune fields and glacial lake deposits also occur.

The grasslands are dominated by rough fescue. June grass, western porcupine grass, northern wheat grass and Hooker's oat grass are also important. Common forbs include prairie crocus, prairie sagewort, mouse-ear chickweed, wild blue flax and three-flowered avens.

Wildlife species of the Northern Fescue Subregion are similar to those found in the Mixedgrass Subregion.

The **Foothills Fescue Subregion** is located along the flanks of the Rocky Mountain foothills and includes the Porcupine Hills, Sweetgrass Hills and parts of the Cypress Hills plateau. Elevations are much higher than in the other two grassland subregions, ranging up to 1400 metres in the Cypress Hills.

Chinooks are more frequent and winters are milder with more spring snowfall than in the Northern Fescue Subregion.

Grasslands are dominated by rough fescue, bluebunch fescue, Parry oat grass and intermediate oat grass. In the Cypress Hills, Parry oat grass is rare and bearded wheat grass is common. Extensive narrow-leaf cottonwood forests, which are found nowhere else in Canada, occur along the Oldman, Belly, Waterton and St. Mary rivers.

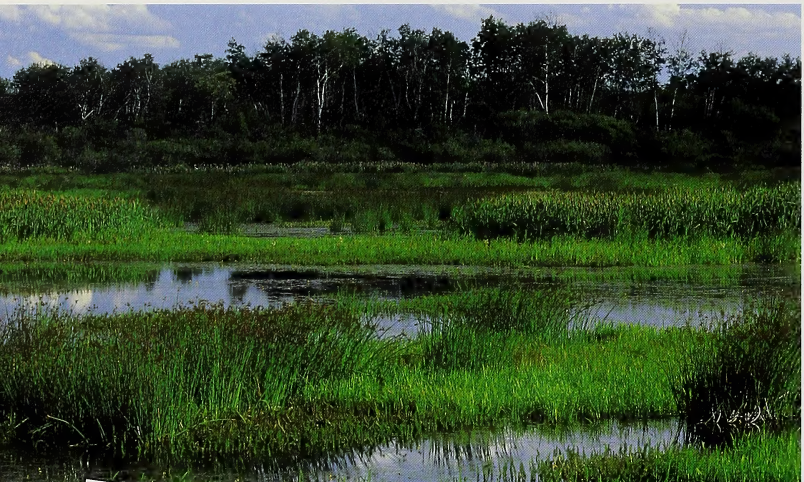
There are fewer animal species in the Foothills Fescue Subregion compared with the other two subregions in the Grassland Natural Region.

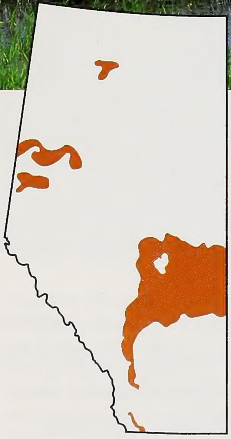
*Above: The* ***Northern Fescue Grassland*** *is characterized by rolling moraine, but it also includes badlands along the Red Deer River north of Drumheller.*
*(Charles Truscott)*
*Right: Grasslands near Ross Lake south of Lethbridge are under consideration as an ecological reserve to represent the* ***Foothills Fescue Subregion****.*
*(Charles Truscott)*

# Parkland Natural Region

The Parkland Natural Region forms a broad transition between the grasslands to the south and the forests to the north and is present only in the prairie provinces of Canada.

*Below: Ribstone Marsh and similar wetlands in the **Central Parkland** are some of the most productive waterfowl habitat in North America. (Charles Truscott)*

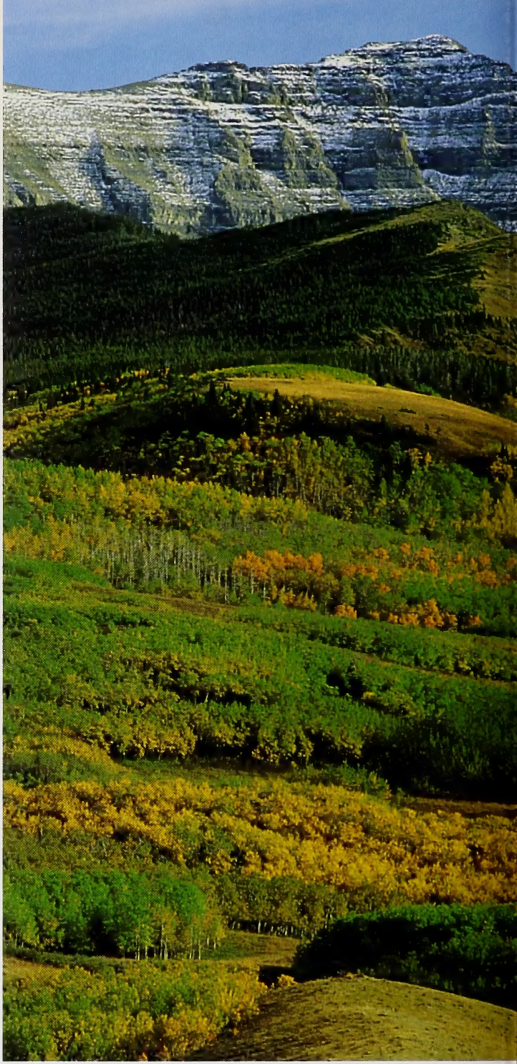




There are three subregions in this natural region. Each is separated on the basis of geographic location and vegetation differences.

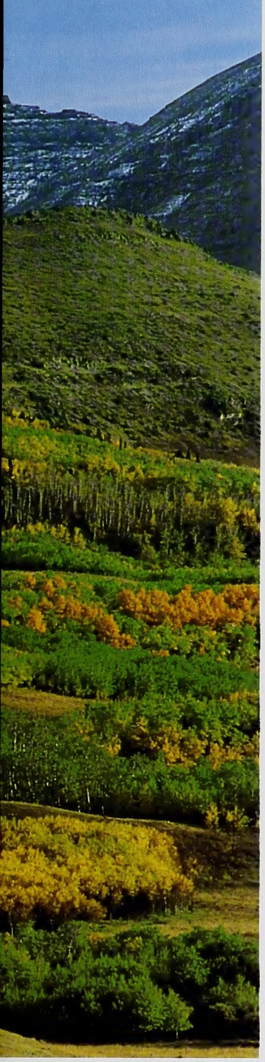
The **Central Parkland Subregion** extends in a broad arc up to 200 km wide between the grasslands and boreal forest. Surficial deposits include hummocky and ground moraines, glacial lake beds, kame moraines and dune fields. Elevations range from about 500 metres above sea level where the Battle River enters Saskatchewan to around 1100 metres in the west. Lakes and permanent wetlands are common.

Within this subregion, there is a gradual transition from grassland with groves of aspen in the south to closed aspen forest in the north. Native vegetation is scarce because most land has been cultivated to grow agricultural crops. The majority of the remaining natural land is on rougher terrain or poorer soils.



Aspen and balsam poplar forests are two major forest types that occur in the Central Parkland. Both are characterized by a lush, species-rich understory. Within the grasslands of this subregion, plant species are essentially the same as those found in the Northern Fescue Subregion. Shrub communities of snowberry, rose, choke cherry and Saskatoon are more extensive in the northern portion of the Central Parkland Subregion.

Animals of the Central Parkland Subregion include a mixture of species from the grasslands to the south and the forests to the north. Occurring at the southern edge of this subregion are grassland species such as upland sandpiper, Sprague's pipit and Baird's sparrow which become less common further north. Along the northern fringe, boreal forest species such as woodchuck, broad-winged hawk and rose-breasted grosbeak are more common. Franklin's ground squirrel and piping plover occur primarily in this subregion.



*Above: The rugged and varied terrain of the* ***Foothills Parkland*** *is under represented in Alberta's system of protected areas. (Charles Truscott)*
*Right: Only a few small areas in the* ***Peace River Parkland*** *such as Childs Prairie near Fort Vermilion remain in a relatively natural state making this an endangered space. (Charles Truscott)*

The **Foothills Parkland Subregion** occupies a narrow band along the eastern edge of the foothills from Calgary south to the Porcupine Hills, and from Pincher Creek south to the U.S. border. The topography is rougher than that of the Central Parkland Subregion and elevations are higher, ranging to over 1300 metres above sea level. Surficial deposits include hummocky and ground moraine as well as outwash and glacial lake deposits. River terraces occur in some areas.

Within this subregion, there is also a gradual transition from grassland with groves of aspen to closed aspen forest. This transition occurs over a short distance (1 km to 5 km) because of rapid changes in topography and climate. This compression results in small geographic areas being very diverse.

Grassland communities of the Foothills Parkland Subregion are similar to those of the Foothills Fescue Subregion, supporting fescue/oat grass communities with a large diversity of forb and grass species. Aspen generally dominates upland forests with balsam poplar on moister sites.

Willow groveland is a distinctive community which occurs in the northern part of the subregion.

Many animal species which occur in the Central Parkland Subregion are absent here but other species give the Foothills Parkland Subregion a distinctive character. Rocky Mountain species in upland forests and shrublands include dusky flycatcher, MacGillivray's warbler, lazuli bunting and white-crowned sparrow. In the far south, black-headed grosbeaks and blue grouse are typical of aspen forests.

The **Peace River Parkland Subregion** is characterized by broad, gently rolling plains with scattered uplands and deeply incised, steep-sided river valleys. The main portion of this subregion is found in the Grande Prairie and Peace River areas with smaller areas further north to Fort Vermilion. Most of the extensive grasslands of this subregion have been cultivated and only small, scattered remnants are still in native cover.

The Peace River Parkland Subregion has shorter, cooler summers and longer, colder winters as well as more precipitation and less wind than the other Parkland subregions.

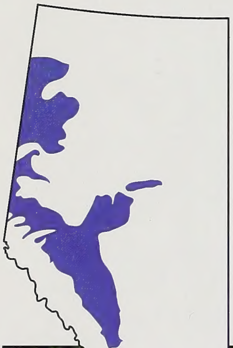
The upland forests of aspen and white spruce are virtually indistinguishable from those of the surrounding mixedwood boreal forest. Grassland communities are dominated by sedges, intermediate oat grass, western porcupine grass, bearded wheat grass and low goldenrod. Grasslands on steep, south-facing slopes are dominated by porcupine grass, sedges and pasture sagewort.

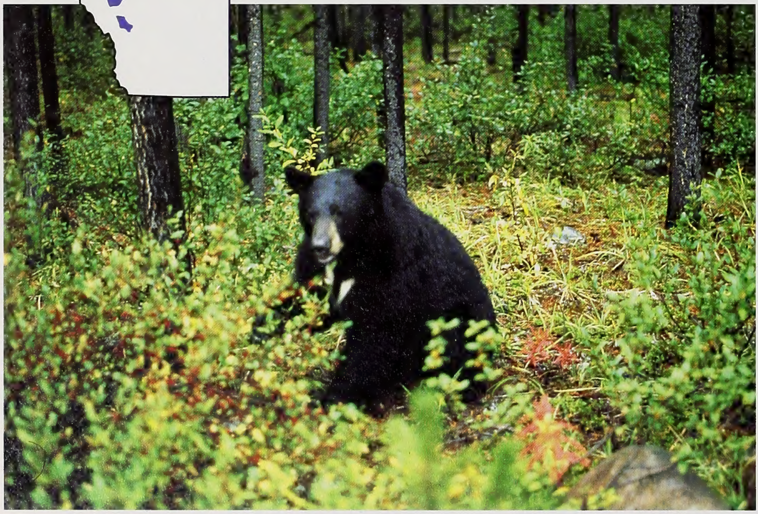
Wildlife of the Peace River Parkland Subregion is similar to that of the adjacent Boreal Forest Mixedwood Subregion. Lakes and ponds of the Peace River Parkland are a major nesting area for the rare trumpeter swan.

# Foothills Natural Region

The Foothills Natural Region extends north from about Turner Valley along the eastern edge of the Rocky Mountains in a gradually widening belt. It also includes several outlying hill masses such as Swan Hills, Pelican Mountains and Clear Hills. Two subregions are recognized.

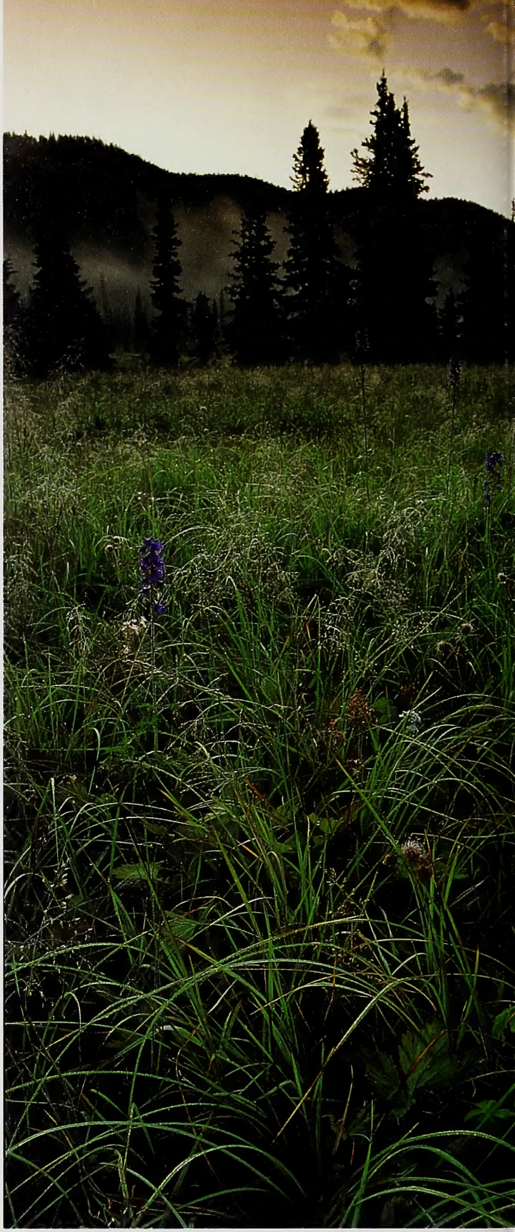
The **Lower Foothills Subregion** includes rolling topography created by the deformed sandstone and shale along the edge of the Rocky Mountains as well as erosional remnants with flat-lying bedrock such as Swan Hills, Pelican Mountains and Clear Hills. Surficial materials are mostly morainal with extensive organic deposits in valleys and wet depressions. Shales and sandstones occur as outcrops along the mountains. Although this subregion is somewhat cooler in summer than the adjacent, lower elevation, Boreal Forest subregions, it is warmer in winter because it is often not influenced by cold Arctic air masses.





*Above: Black bear (Archie Landals)*

The forests reflect the transitional nature of this subregion in which mixed forests of white spruce, black spruce, lodgepole pine, balsam fir, aspen, white birch and balsam poplar occur. Lodgepole pine forests occupy extensive portions of the upland, especially following fire. Black spruce forests occur on moist upland sites in the north and also on poorly drained muskegs.



Many of the animals that inhabit coniferous forests here occur throughout the Boreal Forest, Foothills and Rocky Mountain natural regions. These species include the boreal chickadee, spruce grouse, ruby-crowned kinglet, white-winged crossbill and red squirrel. Deciduous forests support ruffed grouse, warbling vireo, black-capped chickadee and Tennessee warbler. Along the boundary with the Central Mixedwood Subregion, species more typical of the Boreal Forest occur, including moose, yellow-bellied sapsucker, rose-breasted grosbeak and purple finch.

The **Upper Foothills Subregion** occurs on strongly rolling topography along the eastern edge of the Rocky Mountains. Bedrock outcrops of marine shales and non-marine sandstones are frequent.

The Upper Foothills Subregion has the highest summer precipitation in Alberta at about 340 mm and has a mean annual precipitation of about 540 mm. The winters are colder than the Lower Foothills Subregion.

Upland forests of this subregion are nearly all coniferous and dominated by white spruce, black spruce, lodgepole pine and subalpine fir.

Wildlife of the Upper Foothills includes species such as pine siskin, yellow-rumped warbler, ruby-crowned kinglet, white-crowned sparrow and varied thrush. Elk, black bear and grizzly bear are characteristic species. The diversity of animal species is less here than in the Lower Foothills Subregion because of a reduced diversity of plant communities.

*Above: Cow and calf elk (Archie Landals)*
*Left: Shooting star (Alberta Parks Service)*

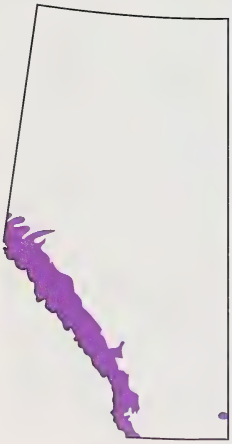
*Above: Marshybank Ecological Reserve, a diverse area within the **Upper Foothills Subregion** is dedicated to scientific research. (Charles Truscott)*
*Right: Thick carpets of moss blanket the floor of coniferous forests of the **Lower Foothills Subregion** in the Clear Hills. (Charles Truscott)*

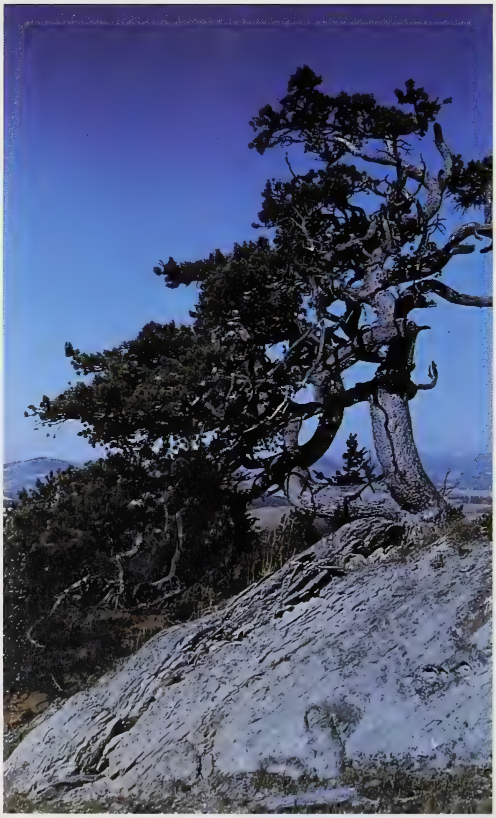
# Rocky Mountain Natural Region

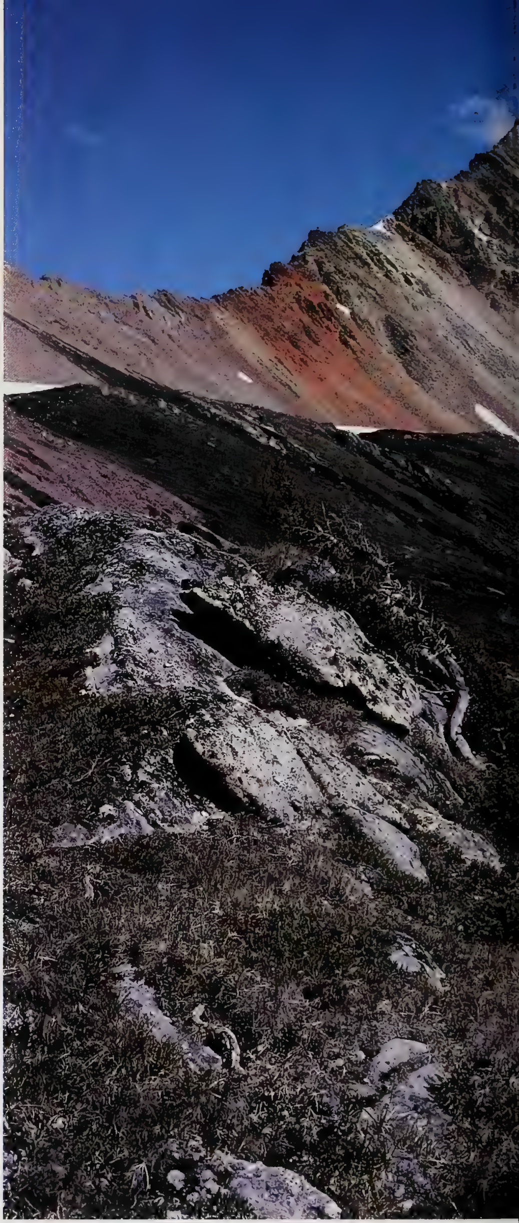
The Rocky Mountain Natural Region along the Continental Divide is underlain primarily by upthrust and folded limestone, dolomite and quartzite and ranges from about 10 km wide in the Waterton Lakes National Park area to more than 100 km wide in the central portion. It contains the most rugged topography in Alberta. Elevations rise from east to west, from major river valleys at 1000 metres above sea level to 3700 metres along the Continental Divide.

The three subregions of this natural region reflect changes in environmental conditions associated with differences in altitude.

*Below: Willow catkins (Archie Landals)*
*Right: Limber pine trained by the prevailing west winds struggle to survive on rock outcrops of the **Montane Subregion**. (Archie Landals)*

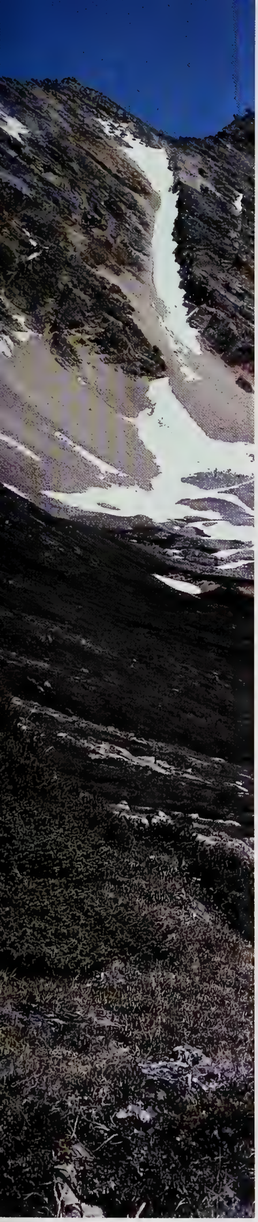






The **Montane Subregion** in southern Alberta occurs on east-west trending ridges that extend out from the foothills. To the north, this subregion occurs mostly along the major river valleys of the Bow, North Saskatchewan and Athabasca rivers.

Chinooks are a characteristic of the subregion and the area is intermittently snow-free in the winter. The montane landscape is characterized by a pattern of open forests and grasslands. Open forests dominated by Douglas fir and limber pine on ridgetops are among the driest forest communities in Alberta. These communities are species-rich, reflecting the diversity of habitats.



Above: Spectacular **Alpine** landscapes attract backcountry recreationists to the White Goat Wilderness Area. (Archie Landals)

Right: Kakwa Falls is a special and unique feature located near the northern limit of Alberta's **Subalpine Subregion**, and an area important to Alberta's Special Places 2000 initiative. (Charles Truscott)

Limber pine grows on the most exposed rock outcrops. Lodgepole pine forests occur on upland sites, white spruce forests grow along streams and aspen forests are typically found on terraces. Grasslands are typically dominated by bluebunch wheat grass, fescue grasses and oat grasses with a large diversity of forbs.

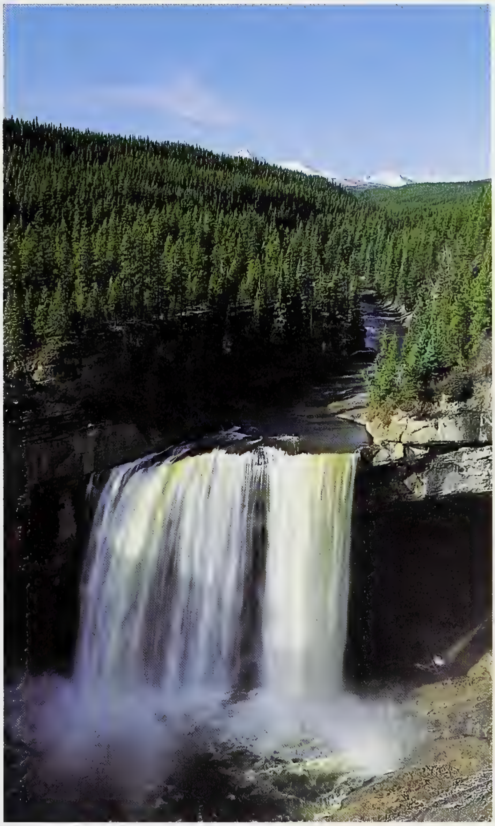
Douglas fir-limber pine habitats are home to blue grouse, mountain chickadee, Clark's nutcracker, mule deer, elk and Columbian ground squirrel. Aspen forests typically contain MacGillivray's warbler, warbling vireo and lazuli bunting. Spotted frog and long-toed salamander which are found in wetlands in this subregion are restricted to the Rocky Mountain Natural Region in Alberta.

The **Subalpine Subregion** occupies a band between the Montane and Alpine subregions in the south and between the Upper Foothills and Alpine subregions in the north. Freezing temperatures occur in all months and the frost-free period is likely less than 30 days. Winter precipitation is higher in this subregion than any other part of Alberta, with often more than 200 cm of snowfall.

The lower Subalpine is characterized by closed forests of lodgepole pine, Engelmann spruce and subalpine fir, while the upper Subalpine has open forests near treeline. Whitebark pine forests occasionally occur and subalpine larch is found to the south of Bow Pass. High elevation grasslands occur on steep south- and west-facing slopes. Snow avalanches create a diverse mix of shrubby and herbaceous communities.

Wildlife species of the coniferous forests include spruce grouse, gray jay, pine siskin, boreal chickadee, marten, snowshoe hare, black bear, deer mouse and red squirrel. Subalpine forest birds and mammals that are restricted to the Rocky Mountain Natural Region include the Stellar's jay, varied thrush, Townsend's warbler, willow ptarmigan, golden-crowned sparrow and mountain caribou.

The **Alpine Subregion** includes vegetated areas, bare rock, snowfields and glaciers above treeline. It is the coldest subregion in Alberta and much of it has no soil.



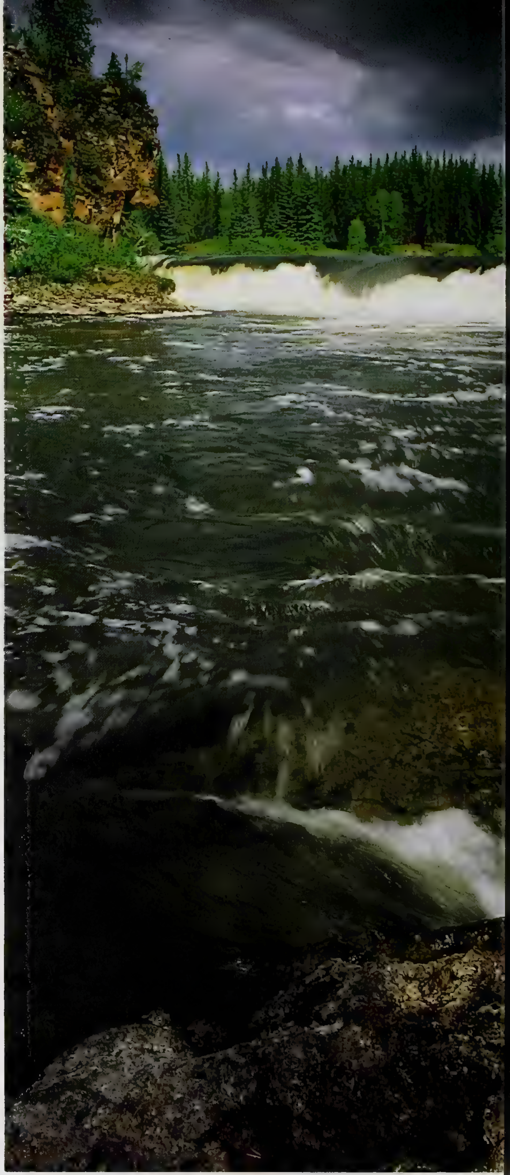
Alpine vegetation is diverse. Deep, late-melting snowbeds are occupied by black alpine sedge communities. Moderate snowbed communities contain dwarf shrub heath tundra which is dominated by heathers and grouseberry. Shallow snow areas on ridgetops and other exposed sites contain communities dominated by white mountain avens, snow willow and moss campion. Diverse, colourful herb meadows occur in moist sites below melting snow banks or along streams. Lichen communities on rock struggle to survive at the highest elevations.

Many mammals range regularly in both the Subalpine and Alpine subregions, including Columbian ground squirrel, pika, hoary marmot, grizzly bear, mountain goat and bighorn sheep. White-tailed ptarmigan, rosy finch, horned lark and American pipit are restricted to the Alpine Subregion during the nesting season.

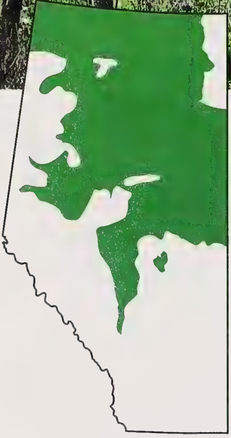
# Boreal Forest Natural Region

The Boreal Forest Natural Region is Alberta's largest Natural Region. It consists of broad lowland plains and discontinuous hill systems. The bedrock is buried beneath deep glacial deposits. Outcrops occur only rarely along major river valleys. The presence of extensive wetlands is a major characteristic of this natural region. Bogs, fens, swamps and marshes are common.

The Boreal Forest Natural Region is very diverse and has six subregions which are separated on the basis of vegetation, geology and landforms.



*Below: Elk Island National Park in the **Dry Mixedwood Boreal Forest** has one of the highest concentrations of large mammals in North America. (Archie Landals)*

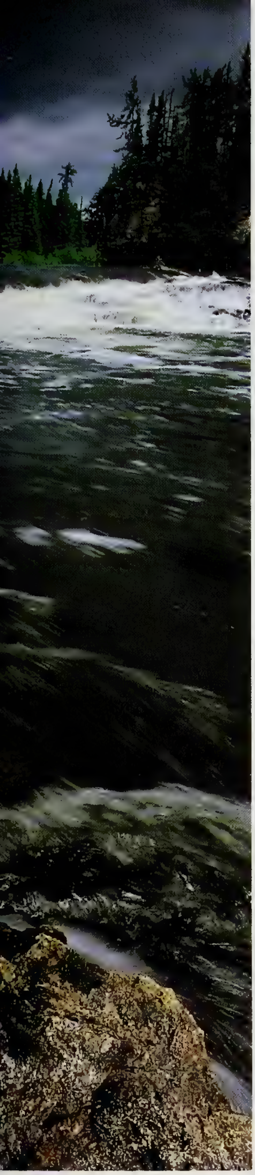


The **Dry Mixedwood Subregion** is characterized by level to undulating terrain. Surficial deposits are mostly ground and hummocky moraines with some areas of sand dunes and sandy outwash plains.

The vegetation is transitional between that of the Central Parkland and Central Mixedwood subregions. Aspen occurs in both pure and mixed stands. Balsam poplar frequently occurs with aspen, especially on moister sites. Successionally, white spruce and balsam fir may replace aspen and balsam poplar. Coniferous species are more common further north with mixed stands of aspen and white spruce being widespread.

Aspen forests have a diverse understory. Coniferous forests generally have a less diverse understory but with a greater cover of moss species. Dry, sandy uplands are usually occupied by jack pine forests. These may be quite open and have a prominent ground cover of lichens. Peatlands are common, but not as prevalent as in other boreal forest subregions.

Characteristic wildlife species of deciduous forests include least flycatcher, house wren, northern oriole and rose-breasted grosbeak. Species of mixedwood forests include yellow-bellied sapsucker, Swainson's thrush, magnolia warbler, white-throated sparrow, pileated woodpecker and northern goshawk.



*Above: Whitemud Falls Ecological Reserve includes a unique stretch of the Clearwater River in the* ***Central Mixedwood Boreal Forest****. (Charles Truscott)* *Right: Crater Lake on Mount Watt north of High Level reflects the early morning light of the* ***Wetland Mixedwood Boreal Forest****. (Charles Truscott)*

The **Central Mixedwood Subregion** is the largest subregion in Alberta. It has low relief and a level-to-undulating surface. The climate is somewhat moister and cooler than the Dry Mixedwood Subregion.

Aspen occurs in both pure and mixed stands, frequently with balsam poplar and white birch. Successionally, white spruce and balsam fir will replace aspen and balsam poplar as stand dominants; however, frequent forest fires seldom permit this succession. River flats have white spruce or white spruce-balsam poplar forests that often contain large trees which have benefited from the favourable nutrient and moisture regimes.

The wildlife of this subregion is the most diverse of the Boreal Forest Natural Region. The species of coniferous forests are wide-ranging and include gray jay, red-breasted nuthatch, pine siskin, red- and white-winged crossbills, dark-eyed junco, boreal chickadee and red squirrel. The bay-breasted, Cape May and blackburnian warblers are confined largely to mature conifer-dominated mixedwood stands in the central and eastern portions of the subregion. Balsam fir stands have a particularly diverse assemblage of coniferous forest birds.

The most species-rich habitats are mixedwoods and shrublands associated with swamps, ponds, streams and lakes. Beaver, moose, snowshoe hare, black bear, gray wolf, Canada lynx, least chipmunk and ermine are common in these habitats. Fisher, wolverine, river otter and woodland caribou are found in some areas.

The **Wetland Mixedwood Subregion** has nearly level to gently rolling topography. Surficial materials are predominantly glacial lake sediments overlain by extensive organic deposits.

The climate is colder than the Central Mixedwood Subregion but more moderate than the Subarctic or Boreal Highlands subregions. Snow cover lasts an average of 185 days per year, one of the longest in Alberta.

Vegetation is similar to that of the Central Mixedwood Subregion; however, there are more peatlands, willow-sedge wetlands and upland black spruce forests. Drier sites typically have pine or aspen-white spruce mixedwood forests.

Wildlife in the Wetland Mixedwood Subregion is sparse, both in species and numbers, because of the relative scarcity of deciduous and mixedwood plant communities. Extensive wetlands provide habitats for waterfowl including sandhill cranes and the endangered whooping crane.

*Right: Clear lakes such as Peerless Lake are an important part of the landscape of the* ***Boreal Highlands****. (Archie Landals)*
*Below: The Peace Athabasca Delta in Wood Buffalo National Park is one of the largest freshwater deltas in the world and is a special feature of the* ***Peace River Lowlands****. (R. Lewis, C.P.S.)*

The **Boreal Highlands Subregion** occurs on the sides and tops of plateaus and hill masses. It includes portions of the Cameron Hills, Caribou Mountains, Buffalo Head Hills, Birch Mountains and Thickwood Hills as well as the highlands south of Fort McMurray and around Graham and Peerless lakes.

Climatic conditions are cooler and moister than the Central Mixedwood Subregion and, as a result, the mixedwood forests of aspen and white spruce contain proportions of balsam poplar. Black spruce forests occur more frequently on upland sites. Pure stands of coniferous forests are common. Peatlands are common and extensive and permafrost is frequently present.

The animals of the Boreal Highlands Subregion are similar to those of the Central Mixedwood Subregion. The occurrence of woodland caribou in the Birch and Caribou mountains is noteworthy, although this species also uses adjacent subregions.

*Above: Fireweed and stunted black spruce are part of the ecotourism appeal of the* ***Subarctic Boreal Forest*** *in the Caribou Mountains. (Charles Truscott)*
*Right: White-throated sparrow (Alberta Parks Service)*

The **Peace River Lowlands Subregion** consists primarily of fluvial landforms along the lower Peace, Birch and Athabasca rivers including the Peace-Athabasca Delta – one of the largest freshwater deltas in the world.

White spruce forests with large trees occur on some terraces along major rivers. Jack pine forests occur on dry uplands; mixedwood forests of aspen, balsam poplar and white spruce grow on moister sites. There is a complex mosaic of aquatic, shoreline, meadow, shrub and marsh vegetation that occurs on lowlands in the area. Much of this complexity is caused by periodic flooding and deposition of sediments.

The Peace-Athabasca Delta supports a rich wildlife population and is a major nesting, moulting, staging and migration area for waterfowl. Bison use the extensive wet sedge meadows of the delta. American white pelicans nest along the Slave River and the most northerly populations and hibernacula of the red-sided garter snake occur here.

The Peace River Lowlands Subregion is home to a diverse assemblage of fish including lake whitefish, northern pike, emerald shiner, longnose sucker, trout-perch, walleye, ninespine stickleback, flathead chub, burbot, spottail shiner, spoonhead sculpin and longnose dace. Round whitefish and short-jawed cisco, which occur nowhere else in Alberta, are found here.

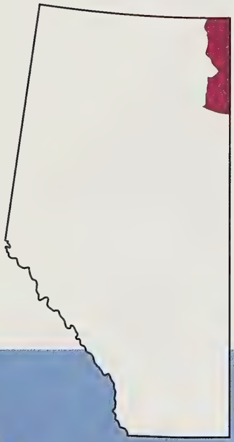
The **Subarctic Subregion** occurs on the tops of the Birch Mountains, Caribou Mountains and the Cameron Hills. These flat-topped hill systems are erosional remnants that rise above the surrounding plain. Surficial deposits are primarily till or organic peat with discontinuous permafrost. Palsas and peat plateaus in the peatlands are characteristic of this subregion.

Open forests of black spruce-Labrador tea-lichen on peat represent the most common forest type. Widespread fires have created large areas of heath shrub-lichen with scattered, young black spruce.

The Subarctic Subregion has less wildlife diversity than other Boreal Forest subregions because of the harsh environment and limited variety of habitats. Some boreal forest species are either local or absent. Species more typical of subarctic habitats are present here, including the red-throated loon, Arctic loon, surf scooter, American tree sparrow and red-necked phalarope.

Common species of black spruce forests include gray jay, common raven, dark-eyed junco, chipping sparrow, red squirrel, snowshoe hare and black bear. Woodland caribou occur in the Birch and Caribou mountains. Wetland species include lesser yellowlegs, rusty blackbird and moose. The largest concentration of nesting bald eagles in Alberta is found around Bistcho Lake.

# Canadian Shield Natural Region



The Canadian Shield extends only peripherally into the far northeast corner of Alberta and includes two distinctive subregions.

*Above: White pelicans (Alberta Parks Service)*

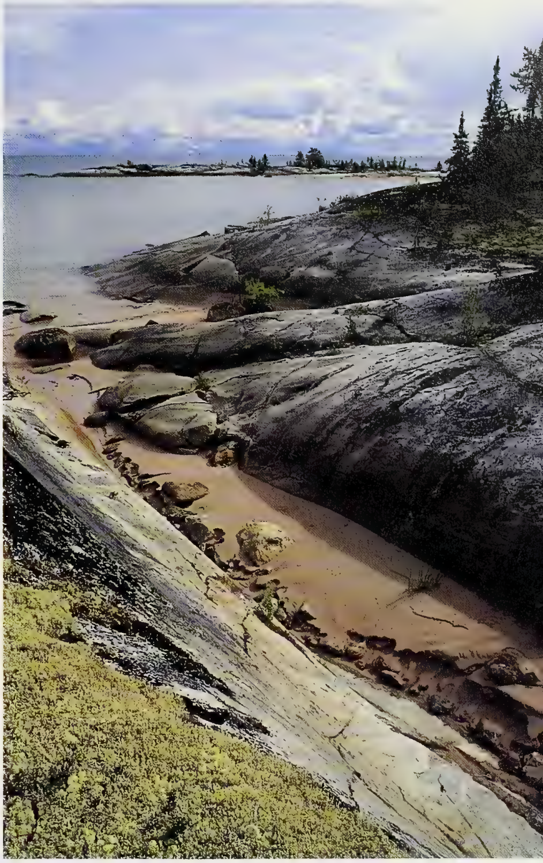
The **Athabasca Plain Subregion** is generally of low relief. Sand deposits are derived from the underlying Athabasca sandstones. Extensive stretches of sandy beach occur along Lake Athabasca, including a sand spit that juts 3 km into the lake at Sand Point. Distinctive landscape features include large areas of kame and kettle and active sand dunes. The kames, at over 60 m high, are among the largest in the world. The active dune system is the largest in Alberta. Stabilized paleodunes in the area are unique in Alberta because they are aligned in an opposite direction to the prevailing wind and more recent dunes in the province. Longitudinal dunes of similar size do not occur in any other place in Alberta. Numerous lakes dot the landscape. Rivers are small and uncommon.

Jack pine forests occur on sandy uplands. Peatlands range from relatively dry bogs dominated by jack pine, black spruce, Labrador tea and reindeer lichen to wetter peatlands with black spruce, tamarack, Labrador tea and sphagnum. A number of rare, endemic and disjunct plant species occur in this subregion.

The environment in the immediate vicinity of Lake Athabasca is different from the main uplands. "Park-like" open white spruce forests occur along the shores of Lake Athabasca.

Little is known of the wildlife of this subregion; however, species that occur in the adjacent Kazan Upland and Central Mixedwood subregions can probably be expected here. Sandhill cranes and Arctic and Caspian terns are known to breed here.

The **Kazan Upland Subregion** is characterized by the extensive outcroppings of Precambrian granitic bedrock. The bedrock outcrops and their acidic content directly influence the vegetation composition. Glacial erosion has produced highly polished, striated and grooved rock surfaces. Rock-basin lakes are common throughout this subregion. Rivers are small, uncommon and mostly slow-moving.

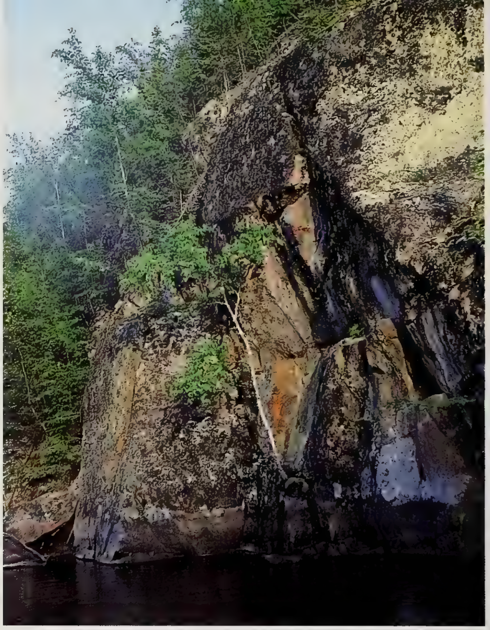


*Top: Athabasca Dunes Ecological Reserve protects a unique and fragile sand dune environment in the* ***Athabasca Plain Subregion****. (Archie Landals)*
*Above: Pond lily (Archie Landals)*
*Right: The* ***Kazan Upland Subregion*** *with rugged granite outcrops of the Canadian Shield is not represented in Alberta's system of protected areas. (Charles Truscott)*

The vegetation of the uplands is a mosaic of rock barrens, open forests of jack pine on sand plains and rocky hills, and black spruce forests in wet depressional peatlands. The understory beneath jack pine forests is quite simple and lichens are common. Peatlands are mainly acidic, nutrient-poor bogs dominated by black spruce, tamarack, Labrador tea, reindeer lichen and sphagnum. Discontinuous permafrost is common in the peatlands.

Characteristic animals of upland jack pine forests include common nighthawk, gray jay, common raven, boreal chickadee, snowshoe hare, Canada lynx and black bear. Wetland and open water species include common loon, lesser scaup, bufflehead, Bonaparte's gull, spotted sandpiper, alder flycatcher, rusty blackbird, moose, beaver and mink. Bald eagle and osprey nest near lakes. Golden eagles, which do not nest in the boreal forest, nest locally on cliffs in the area, as does the rare and endangered peregrine falcon. The arctic loon is a subarctic species that is known to nest in the subregion. Willow ptarmigan and, occasionally, the barren ground caribou and Arctic fox are found here during winter.

# THEMES – Key Classification Levels



Natural history themes are the key working levels of classification. They operate at a practical scale for describing the full range of Alberta's natural diversity.

Themes can be **representative** of typical widely distributed landscapes or **special**, which refers to unique or atypical features that are generally site-specific.

Three levels of themes are employed. The Level I Theme is a broad landscape type within a subregion. Level II Theme refers to a broad habitat/vegetation type within a Level I Theme. Level III Theme identifies a specific geological feature, plant community or species within a Level II Theme.

Together with natural regions and subregions, themes make up a five-level classification system (see examples on opposite page).

Level I Themes can be used to portray the natural diversity within the various natural regions and subregions. Level I Themes are the most important classification level because of their close linking of landforms and dependent lifeforms. Twenty Level I Themes have been identified for the province as a whole. These Level I themes appear in different combinations across the 19 subregions for a total of 151 Level I themes.

*Top right: Wylie Lake (Archie Landals)*
*Below: Larch Valley (Archie Landals)*

Since Level I themes can be readily measured on existing maps they are most useful for evaluating Alberta's protected areas network. In this way Level I themes help to identify gaps and deficiencies in the system.

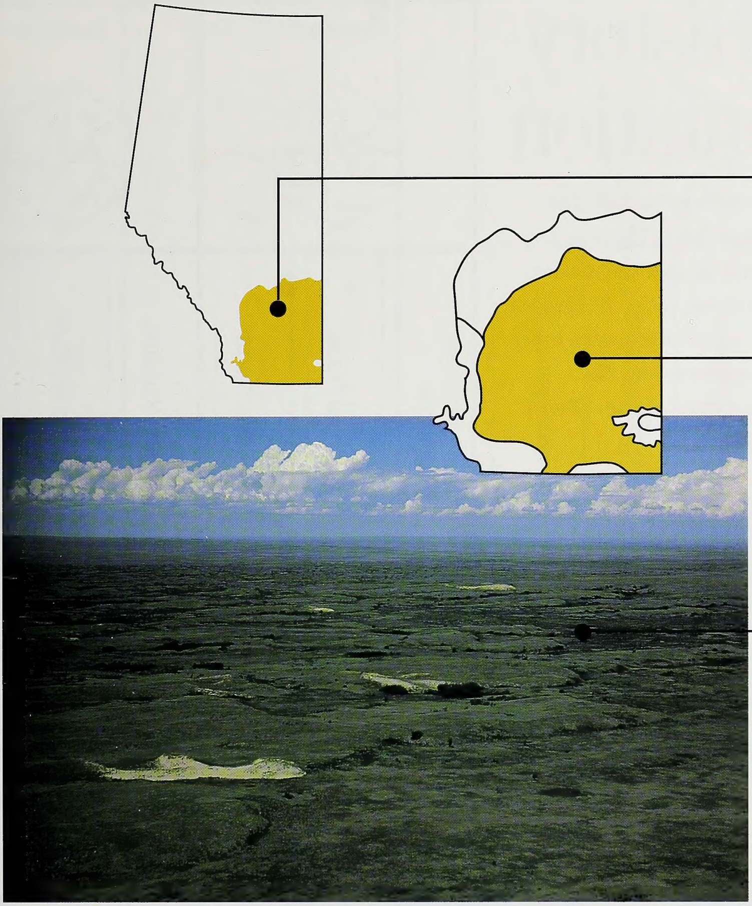
Unless a protected area makes up a large portion of a subregion, more than one area will be needed to achieve adequate representation. Five widely spaced areas of a minimum size of 10 km$^2$ is recommended for most of these themes. Two widely-spaced large units that greatly exceed the minimum size criteria would provide suitable representation.

Level II and Level III are not as readily measured from existing inventories and maps. The presence or absence of specific Level II and III themes are most useful for comparing candidate protected areas.

For example, two candidate sites of approximately the same size may have similar Level I themes but very different Level II themes. In this case, either site would make the same contribution to achieving the Level I target. The site that contains the most Level II themes that are not presently well represented in the system, however, would make a greater contribution to protecting the diversity of Alberta's natural heritage.

Alberta's system of classification for natural history themes has been held up as a national model by ecological experts. Its special value is in helping to establish targets, identifying gaps and sorting out candidate areas from existing information. The system also makes reporting on progress toward completing a comprehensive network of protected areas straight forward.

## CLASSIFICATION HIERARCHY



**Natural Regions** are broad geographic regions that provide the big picture of Alberta's landscapes. The landscape patterns of each individual region contain a similar mix of vegetation, soil and landform features. Alberta has six natural regions (refer to Map 1 on page 5). **Example:** The Grassland Natural Region is a flat-to-gently rolling plain with a few major hill systems. Most of the bedrock is covered with glacial till deposits; some areas are blanketed by glacial lake sediments, sand dune fields and outwash plains.

**Subregions** are narrowly defined geographic regions within a natural region. Subregions are areas with similar landscape patterns that are distinct from the other subregions within the same natural region. Different criteria, matched to the range and scale of natural features that occur within each natural region, are used to separate the subregions. Alberta's six natural regions are divided into nineteen subregions. **Example:** Grassland subregions are separated primarily on the basis of climatic, soils and vegetational factors. The Mixedgrass Subregion is the warmest and driest in Alberta. The name "Mixedgrass" comes from the predominance of both short and mix-height grasses.

**Level I Themes** are broad, significant, easily recognizable landscape types within a subregion. They contain a complex of physical and biological features that are readily apparent. Twenty Level I themes have been identified for the province as a whole (see Table, page 22). **Example:** Sandy Upland - Dune Fields is one of the 13 Level I themes identified for the Mixedgrass Subregion. In this aerial view of the Middle Sand Hills National Wildlife Area, most of the dunes have been stabilized by vegetation. However, small patches of active sand also occur. (Archie Landals)

**Level II Themes** are distinctive vegetation assemblages, habitat types or highly visible surficial geology components. Work is still required to refine the number of Level II themes across the province. Their identification depends upon the interpretation of aerial photography and associated field checking. **Example:** Active Sand is one of six Level II themes identified within the Sandy Upland - Dune Fields of the Mixedgrass Subregion. This photograph shows an area of active sand in the dune fields near Sounding Lake. (Alberta Parks Service)

*Parabolic dunes such as this one along the Red Deer River near Bindloss become active when vegetation cover is insufficient to stop the wind from moving the sand. (Archie Landals)*

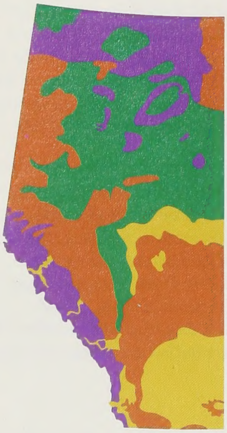
*In Alberta, Ord's Kangaroo Rat is found only in association with areas of active sand in the Mixedgrass Subregion. (Alberta Parks Service)*

*The Western Spiderwort is known to occur in only one location in Alberta, – the active sand dunes around Pakowki Lake. (Natural and Protected Areas)*

**Level III Themes** are finer breakdowns of Level II themes. Level III themes include specific plant community types and wildlife habitats. They also include rare plants and animals and specific bedrock and landform types. Level III themes will be added as detailed field studies increase our knowledge of Alberta's natural heritage. **Example:** Active sand dunes in the Mixedgrass Subregion include specific dune forms as well as providing habitat for rare plants and animals.

# Level I Natural History Theme Representation

The final two graphics in this report visually depict the status of Alberta's network of Special Places as of January 1, 1993. The table shows the distribution of the twenty Level I natural history themes across the nineteen subregions. Colours are used to depict four general levels of representation within the existing system. The accompanying map is a visual overview of Level I Theme representation on a subregion basis.



*Adequacy of representation of Level I Natural History Themes in Alberta's Protected Areas Network 1992*

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| 🟧 | *No or little* |
| 🟨 | *Some* |
| 🟩 | *Moderate* |
| 🟪 | *Good* |
| ⬜ | *Natural history theme does not occur in this subregion.* |

| | Grassland | | | Parkland | | |
|---|---|---|---|---|---|---|
| | Mixedgrass | Northern Fescue | Foothills Fescue | Central Parkland | Foothills Parkland | Peace River Parkland |
| Non-Sandy Upland - Glacial Lake Bed | 🟧 | 🟧 | 🟧 | 🟧 | 🟧 | 🟧 |
| Non-Sandy Upland - Ground Moraine | 🟧 | 🟧 | 🟧 | 🟧 | 🟧 | ⬜ |
| Non-Sandy Upland - Hummocky Moraine | 🟨 | 🟧 | 🟧 | 🟧 | ⬜ | ⬜ |
| Non-Sandy Upland - Bedrock | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ |
| Sandy Upland - Sandy Plain | 🟩 | 🟧 | 🟪 | 🟧 | ⬜ | ⬜ |
| Sandy Upland - Sandy Dune Field | 🟩 | 🟧 | ⬜ | 🟧 | ⬜ | ⬜ |
| Sandy Upland - Kame Moraine/Complex | ⬜ | ⬜ | ⬜ | 🟧 | ⬜ | ⬜ |
| Valley/Ridge - Exposed Slope | 🟪 | 🟧 | 🟧 | 🟧 | 🟧 | 🟧 |
| Valley/Ridge - Protected Slope | 🟪 | 🟧 | 🟨 | 🟧 | 🟨 | 🟩 |
| Valley/Ridge - Floor/Stream | 🟨 | 🟧 | 🟧 | 🟧 | 🟨 | 🟧 |
| Valley/Ridge - Ridge/Valley Wall | ⬜ | ⬜ | 🟧 | ⬜ | 🟧 | ⬜ |
| Valley/Ridge - Springs | 🟨 | 🟧 | 🟧 | 🟪 | 🟨 | ⬜ |
| Wetland - Wet Meadow | 🟨 | 🟧 | 🟧 | 🟩 | 🟧 | 🟧 |
| Wetland - Shallow Marsh | 🟧 | 🟧 | 🟧 | 🟪 | 🟧 | 🟧 |
| Wetland - Deep Marsh | 🟧 | 🟧 | 🟧 | 🟪 | 🟧 | 🟧 |
| Wetland - Alkali Wetland | 🟩 | 🟧 | ⬜ | 🟧 | ⬜ | ⬜ |
| Wetland - Mineral | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ |
| Wetland - Organic | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ |
| Wetland - Lake | ⬜ | 🟧 | ⬜ | 🟧 | ⬜ | 🟧 |
| Glacier/Snowfield | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ | ⬜ |

| Foothills | | Rocky Mountain | | | Boreal Forest | | | | | | Canadian Shield | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper Foothills | Lower Foothills | Montane | Subalpine | Alpine | Dry Mixedwood | Central Mixedwood | Wetland Mixedwood | Boreal Highlands | Peace River Lowlands | Subarctic | Athabasca Plain | Kazan Upland |
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